



Houston Ship Channel Monitoring Program

SPECIAL REPORT NO. SR-3

SPECIAL REPORT
ON
HOUSTON SHIP CHANNEL MONITORING PROGRAM

REPORT NO. SR-3

PREPARED BY
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DISTRICT 7
TEXAS WATER QUALITY BOARD
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INTRODUCTION

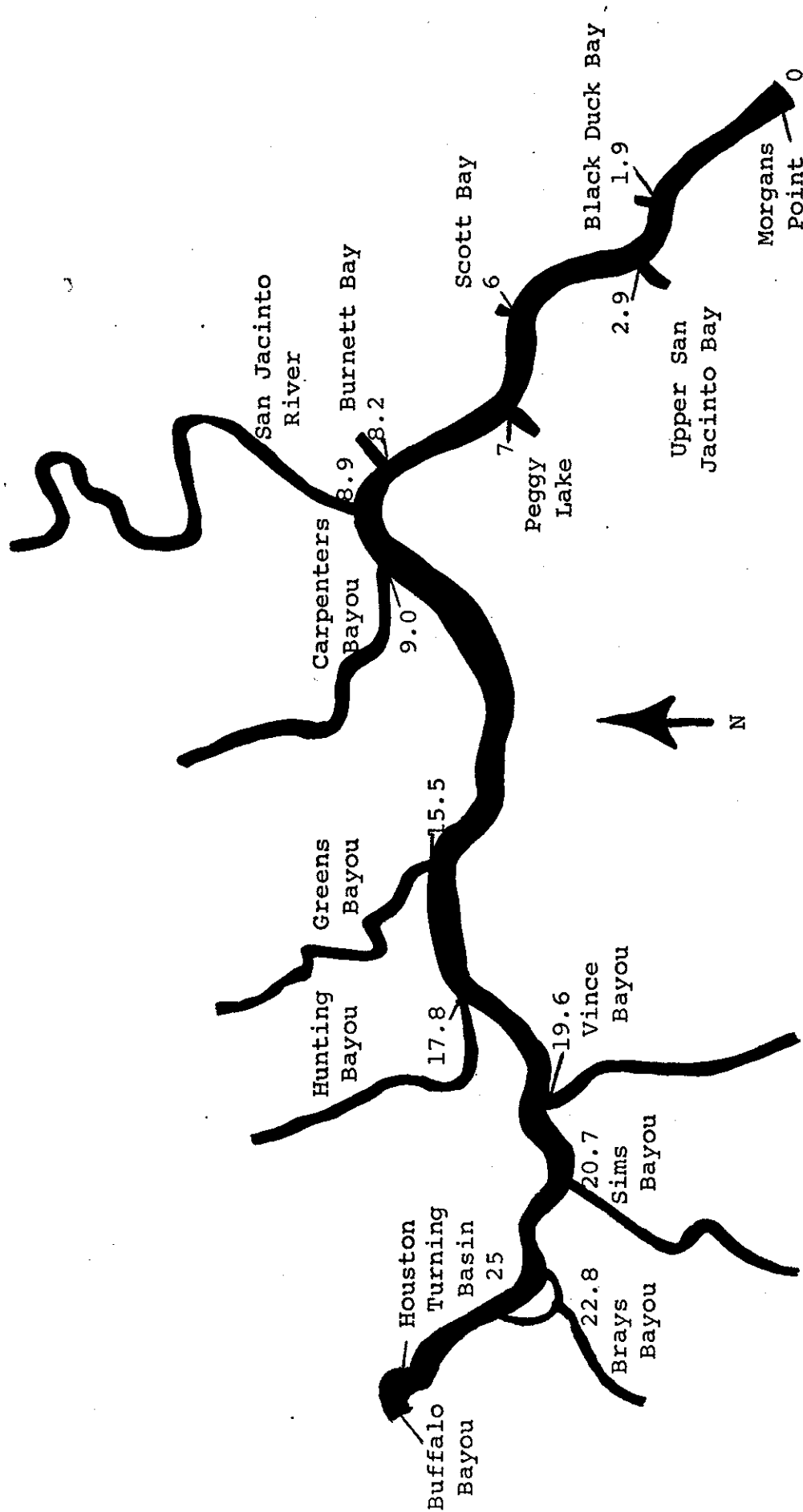
The Houston Ship Channel is an area of intense interest with respect to water quality. Frequent inquiries regarding its condition are received from diverse groups including industries, concerned citizens, environmental groups, school teachers, and students. In order to provide current and accurate information, the Water Quality Board is publishing herein water quality and biological data collected during the period July 1973 through June 1974. This information provides a fairly complete picture of the range of variation that is seen in Channel quality.

The locations of all Water Quality Board monitoring stations, and of major industrial and municipal discharges, is given in Table I. Data from five representative sampling stations between Morgan's Point (Mile 0) and the Turning Basin (Mile 25), are sufficient to illustrate general conditions in the Ship Channel.

Table II contains field measurements and laboratory results for water samples collected at depths of one foot (surface) and 40 feet. All values are expressed as milligrams/liter, essentially equivalent to parts/million, with the following exceptions: temperature ($^{\circ}\text{F}$), pH (pH units), turbidity (Jackson Turbidity Units), conductivity (micromhos/cm), and coliform bacteria (Number/100 milliliters).

The heavy metals results in Table III are based on samples collected by compositing water from the surface to the bottom. Plankton samples (Table IV) were collected at or near each of the five stations. Nekton, the animals that are larger and stronger swimmers than plankton, were collected at the intake screens of Diamond Shamrock, Deer Park Plant, and Houston Lighting and Power Company, Deepwater Plant (Table V).

It is important to realize that the Houston Ship Channel is a dynamic estuarine system. At no time will precisely the same conditions prevail that were previously found at the same location. The dissolved oxygen concentration may be the same as it was yesterday, for instance, but never will the combination of temperature, conductivity, pH, and all other parameters be the same.



MILEAGE SCHEMATIC OF THE HOUSTON SHIP CHANNEL

MILEAGE POINTS OF INDUSTRIAL AND MUNICIPAL DISCHARGES INTO
HOUSTON SHIP CHANNEL (SAN JACINTO RIVER BASIN)

<u>Mile</u>	<u>Feature</u>	<u>State Monitoring Station Number</u>
0.0	I. Morgan's Point (S*) (CM 89) (30 mi. from Bolivar Roads)	1005.01
	II. Barbours Cut (S)	2436.01
	A. Morgan's Point STP	
	I. Tabb's Bay (N) (CM 98)	2426.01
1.1	A. Goose Creek	
	1. Baytown West Main STP	
	2. Agriculture	
	3. Undesignated	
1.9	I. Black Duck Bay (N) (Entrance)	2428.01
2.6	I. Exxon Company (N) (CM 101)	
2.8	I. Baytown Tunnel (SH 146) (CM 103)	
2.9	I. San Jacinto Bay (S) (CM 15)	2427.01
	A. E. I. duPont (.6 mile from HSC)	
	B. U. S. Industrial Chemical Co.	
	C. Dram Ditch	
	1. Upjohn Company	
	D. Houston Lighting & Power, Bertron Station	
	E. Undesignated	
3.9	I. Exxon Chemical Emergency Bypass (N)	
4.1	I. Exxon Docks	
6.0	I. Scott Bay (N) (CM 114)	2429.01
	A. Ashland Chemical Company	
	B. Undesignated	
7.0	I. Peggy Lake (S) (CM 120)	1005.02
	A. Diamond Shamrock Monument Plant	
	B. Celanese Plastics	
	C. Texas Alkyls	
8.2	I. Burnett Bay (N) (CM 126)	2430.01

*S = Southside of channel
N = Northside of channel

<u>Mile</u>	<u>Feature</u>	<u>State Monitoring Station Number</u>
8.9	I. San Jacinto River (Lynchburg Ferry) (N) (CM 127) (5440 MGD) (Battleground Road, Deer Park - LaPorte City Boundary) A. Channel Shipyards B. Southwestern Barge C. IH 10 Bridge E. Baroid F. Arco Chemical G. Undesignated	1001.01
9.0	I. Battleship Texas and San Jacinto Monument (S) (CM 131) II. Carpenters Bayou (N) (224 MGD)	1006.01
10.7	I. Equity Export Corp. (S) (CM 136)	
10.8	I. Jacinto Port Terminal (N)	
10.9	I. Truckers Bayou (S) A. Rohm and Haas B. Intercontinental Terminals C. Rollins-Purle	
11.0	I. CM 138 (HSC)	1006.05
11.5	I. Patrick Bayou (S) (CM 139) A. Shell Chemical Company B. Diamond Shamrock Deer Park Plant C. Lubrizol Corporation (Deer Park Eastern City Limit)	Nekton Sample
12.7	I. Shell Oil Company (S) (CM 142) II. Cargill (N) III. Undesignated IV. Boggy Creek (Deer Park-Pasadena City Boundary)	
14.1	I. Tenneco Oil Company (S) (CM 145)	
15.2	I. Southland Paper Mills (N) (CM 145) II. Pasadena Deep Water (S)	
15.3	I. Ethyl Corporation (S)	

<u>Mile</u>	<u>Feature</u>	<u>State Monitoring Station Number</u>
15.5	I. Greens Bayou (N) (CM 152) (829 MGD) A. Todd Shipyards B. Diamond Shamrock Greens Bayou Plant C. Pennwalt Corporation D. Merichem Company E. Stauffer (HF Plant) F. Reichold Chemical G. Houston WCID #32	1006.02
16.5 ³	I. Phillips Petroleum Company (S) (Adams Terminal)	
16.6	I. Stauffer Chemical (S)	
16.8- 17.2	I. Armco Steel Corporation (N)	
17.3	I. Hess Terminal (N)	
	II. Olin Mathieson Chemical Corporation (S)	
17.8	I. Hunting Bayou (N) (CM 160) (264 MGD) A. Gulf Terminal (Stormwater Runoff)	
18.0	I. Cottonpatch Bayou (C) A. Premier Petro Chemical Company B. GATX Pasadena Terminal (Outfall #2)	
18.1	I. GATX - Pasadena Terminal (S) (Outfall #1)	
18.6	I. CM 161 (HSC)	
18.7	I. Crown Central and Air Products (S) (GCWDA)	
18.8	I. Washburn Tunnel (CM 163)	
18.9	I. U. S. Plywood-Champion Papers, Inc. (S) (CM 165)	1007.20
	II. Gulf Coast Waste Disposal Authority (S)	
19.6	I. Vince Bayou (S) (71 MGD) A. Pasadena Northside STP - Outfall 1A B. Pasadena Northside STP - Outfall 1B C. Undesignated	
19.7	I. GATX (N) (West Panther Creek)	
	II. Houston Lighting and Power Deepwater Plant (S)	Nekton Sample

<u>Mile</u>	<u>Feature</u>	<u>State Monitoring Station Number</u>
20.2	I. ARCO (S) (GCWDA Pending)	
	II. Robertson Terminals (N)	
	III. Good Pasture Grain (N)	
20.7	I. Sims Bayou (S) (Houston-Pasadena City Boundary) (350 MGD)	1006.03
	A. Houston Sims Bayou STP (Permit 45 MGD-Ave. 55 MGD)	
	B. Goodyear Tire and Rubber Company	
	C. Petro-Tex (GCWDA Pending)	
	D. Sinclair-Koppers	
	E. Houston WCID #47	
	F. Berry Gully	
	1. Houston Gulfway Terrace	
	2. Houston Gulf Palms	
	3. South Houston STP	
	4. Geneva Industries (PCB)	
20.8	I. U. S. Gypsum (N)	
	II. Manchester Docks (S)	
	III. Ideal Cement (N)	
21.3	I. Charter International Oil Company (S)	
	II. U. S. Steel (N)	
21.7	I. U. S. Coast Guard Station (N)	
21.9	I. John W. Mecom and Proler STP (N)	
	II. Fireboat Station (S)	
	A. National Molasses Company (Behind Fireboat Station)	
22.4	I. Interstate Loop 610 Bridge	
22.5	I. Stauffer Chemical Company (S)	
22.8	I. Brays Bayou (S) (apx. 30 miles long) (562 MGD)	
	A. Hermann Park (Bypass)	
	B. MacGregor Park (Bypass)	
	1. Blue Ribbon Packing Co.	
	C. West University STP	
	D. Bellaire STP	
	E. Southwest Houston STP	
	F. Agriculture	
	G. Undesignated	

<u>Mile</u>	<u>Feature</u>	<u>State Monitoring Station Number</u>
24.7	I. Turning Basin A. Undesignated (S) (Jacob Stearns Tallow Handling Plant)	1007.01
25.0	I. Buffalo Bayou (986 MGD avg.) A. Southern Pacific Railroad B. Wayside C. 69th Street D. Houston Belt & Terminal Railroad E. Gulf Coast Portland Cement Company (S) (6203 Industrial Way) F. Industrial Slip (S) G. Houston Northside STP (Lockwood Drive) (N) (55 MGD+) H. Houston Longwood I. Houston West District J. Agriculture K. Undesignated	
30.5	I. Buffalo Bayou at White Oak Bayou (Confluence) A. Reddy Ice Company (Buffalo Bayou) B. Cook Paint and Varnish (White Oak (Bayou) C. Uvalde Rock Asphalt (White Oak (Bayou) D. MKT Railroad (White Oak Bayou)	

TABLE II

PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
IN THE TURNING BASIN (MILE 25.0)

Date	Dissolved Oxygen	Temperature °F	pH	Turbidity	Conductivity	Total Coliform	Fecal Coliform
6/12/74	0.1	83.4	7.3		1,310	870,000	32,000
5/15/74	1.4	78.8	7.1		570	17,000,000	200,000
4/23/74	0.1	73.4	7.3		5,500	640,000	29,000
3/19/74	7.7	71.6	7.1		1,430	>800,000	120,000
2/14/74	1.6	63	7.2		1,300		
1/17/74	6.3	60.8	6.8		700	4,300,000	250,000
12/10/73	0.6	63.5	7.1		6,600	840,000	31,000
11/15/73	0	72.5	7.2		2,750	>80,000	
10/16/73	5.5	74.5	7.4		152	>26,400	>2,640
9/11/73	0.1	81	7.4	100	340	4,500	220
8/14/73	0.2	82	6.7		4,000	24,000	24,000
7/11/73	0.6	81	7.0	75	430	35,000	35,000
Total	24.2	885.5		175	25,082	>24,619,900	>723,860
Average	2.02	73.79		87.5	2,090.17	>2,238,172.7	>72,386
Range	0-7.7	60.8-83.4	6.7-7.4	75-100	152-6,600	4,500-17,000,000	220-250,000

TABLE II
PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
IN THE TURNING BASIN (MILE 25.0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BCD
6/12/74	250	61	13.3	11.1	7.9	<.01		.055	22	22	16	12
5/15/74	90	34	4.90	4.90	4.6	.02		.027	50	50	17	11
4/23/74	1,800	288	9.22	9.22	6.8	.04		0	32	32	17	8
3/19/74	375	64.5	8.50	8.50	5.5	<.01			68	44	16	11
2/14/74	315	50	10.9	8.11	3.5	<.01			36	36	13	19
1/17/74	152	39	3.70	3.41	1.9	.24			108	48	22	6
12/10/73	2,350	397	14.1	9.47	19.0	.01			54	20	18	14
11/15/73	815	158	8.16	6.86	13.7	<.01			60	16	18	13
10/16/73	13	<10	7.06	3.03	2.3	.25			311	29	23	22
9/11/73	35	174	7.00	3.46	7.0	<.01			84	10		5
8/14/73	310	22	3.68		1.94	.19	2.02	.001	50	0		13
7/11/73	43	49	2.70		1.57	.26	3.54	.007	70	50		7
Total	6,548	<1,346.5	83.22	68.06	75.71	<1.05	5.56	.09	945	357	160	141
Average	545.67	<112.2	6.93	6.81	6.31	<.09	2.78	.022	78.75	29.75	17.78	11.75
Range	13-2,350	22-397	2.70-14.1	3.03-11.1	1.57-19	<.01-.26	2.02-3.54	0-.055	22-311	0-50	13-23	5-22

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
IN THE TURNING BASIN (MILE 25.0)

<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Temperature °F</u>	<u>pH</u>	<u>Turbidity</u>	<u>Conductivity</u>
6/12/74	0.0	83.3	7.3		2,350
5/15/74	0.4	75.2	7.1		1,630
4/23/74	0	71.6	7.3		9,070
3/19/74	0.1	69.8	7.2		3,700
2/14/74	0.1	62	7.3		7,600
1/17/74	1.5	57.6	6.8		3,600
12/10/73	0.6	66.2	7.3		14,000
11/15/73	0	72.5	7.2		4,420
10/16/73	3.1	74.5	7.5		149
9/11/73	0.0	80	7.3	150	350
8/14/73	0.1	83	6.9		19,700
7/11/73	0.1	81	7.0	65	480
Total	6	876.7		215	67,049
Average	0.5	73.06		107.5	5,587.4
Range	0-3.1	57.6-83.3	6.8-7.5	65-150	149-19,700

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
IN THE TURNING BASIN (MILE 25.0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	650	106	10.26	8.88	5.9	<.01		.025	22	22	14	6
5/15/74	475	99	3.43	3.43	4.0	.01		.013	316	54	41	13
4/23/74	3,250	494	7.24	6.85	4.7	<.01		0	8	8	17	5
3/19/74	1,200	163	7.85	7.85	5.1	<.01			58	50	11.2	6
2/14/74	2,470	315	12	7.54	2.6	<.01			74	34	5	3
1/17/74	1,060	50	4.61	4.32	2.3	<.01			194	58	28	12
12/10/73	5,590	482	10.2	6.04	10.3	.01			322	64	24	4
11/15/73	1,410	536	6.70	5.23	10.8	<.01			131	40	18	5
10/16/73	13	<10	4.02	2.99	2.3	.29			270	27	22	16
9/11/73	36	96	5.92	3.2	6.2	.16			253	31		7
8/14/73	1,218	28	5.21		2.60	.00	4.01	.010	290	20		11
7/11/73	53	47	2.18		1.53	.26	1.82	.012	60	40		4
Total	17,425	<2,426	79.62	56.33	58.33	<.79	5.83	.06	2,020	448	180.2	92
Average	1,452.08	202.17	6.635	5.63	4.86	<.06	2.91	.015	168.3	37.3	20.02	7.67
Range	13-5,590	<10-536	3.43-12	2.99-8.88	1.53-10.8	0-.29	1.82-4.01	.010-.025	8-322	8-64	5-41	3-16

TABLE II

PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT CM 165 (MILE 18.9)

Date	Dissolved Oxygen	Temperature °F	pH	Turbidity	Conductivity	Total Coliform	Fecal Coliform
6/12/74	0.8	86.9	7.4		4,170	50,000	5,000
5/15/74	0.8	77	7.2		3,050	220,000	2,900
4/23/74	1.8	77	7.4		8,800	260,000	8,000
3/19/74	3.6	71.6	7.2		5,320	460,000	15,000
2/14/74	1.0	66	7.3		6,800	620,000	11,000
1/17/74	5.2	66.2	7.1		3,100	64,000	16,000
12/10/73	0.9	67.1	7.5		10,000	570,000	15,000
11/15/73	2.1	77	7.3		5,950	28,760	
10/16/73	3.4	79.5	7.1		372	231,000	10,230
9/11/73	0.3	82	7.3	95	770	73,000	6,000
8/14/73	0.4	86	7.4		13,500	24,000	24,000
7/11/73	1.8	85	7.2	70	950	13,000	13,000
Total	22.1			165	62,782	2,613,700	126,130
Average	1.84			82.5	5,231.83	217,808.3	11,466.36
Range	0.3-5.2	66-86.9	7.1-7.5	70-95	372-13,500	13,000-620,000	2,900-24,000

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT CM 165 (MILE 18.9)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	1,110	212	12	9.74	2.8	<0.01		.027	36	36	29	7
5/15/74	1,000	168	4.20	360	2.0	0.09		0	6	6	18	4
4/23/74	3,150	549	8.00	7.46	3.7	<0.01		.007	0	0	32	8
3/19/74	1,810	292	11.0	9.85	6.8	<0.01			50	22	34.2	8
2/14/74	2,200	325	12.1	7.51	2.8	.29			34	34	27	4
1/18/74	900	154	1.80	3.74	3.8	.16			64	29	33	5
12/10/73	4,100	412.0	9.6	7.16	10.2	<0.01			59	35	30	7
11/15/73	1,920	79	5.35	4.00	6.6	<0.01			37	24	27	5
10/16/73	80	25.6	4.73	2.44	2.7	.24			50	12	18	22
9/11/73	178	128	4.96	2.2	8.4	.11			59	13		6
8/14/73	4,700	60	4.94		2.24	.04	2.24	.004	25	5		11
7/11/74	182	14	1.47		1.53	.64	1.82	.010	80	40		6
Total	21,330	2,418.6	80.15	414.04	53.57	<1.62	4.06	.048	500	256	248.2	93
Average	1,777.5	201.55	6.68	41.40	4.46	<.135	2.03	.009	41.7	21.3	27.58	7.75
Range	80-4,700	14-549	1.47-12.1	2.2-9.85	1.53-8.4	<.01-.64	1.82-2.24	.004-.027	0-80	0-40	18-34.2	4.22

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT CM 165 (MILE 18.9)

<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Temperature °F</u>	<u>pH</u>	<u>Turbidity</u>	<u>Conductivity</u>
6/12/74	0.0	85.1	7.3		5,250
5/15/74	0.2	76.1	7.3		3,570
4/23/74	0.1	72.5	7.4		10,200
3/19/74	0.1	70.7	7.2		7,780
2/14/74	0.5	61	7.3		10,000
1/17/74	0.7	59.0	7.1		7,400
12/10/73	0.6	65.3	7.5		14,000
11/15/73	1.1	73.5	7.2		9,500
10/16/73	2.5	76	7.2		620
9/11/73	0.5	81	7.4	125	8,600
8/14/73	0.0	84	7.3		28,800
7/11/73	0.5	79	7.2	65	610
Total	6.8	882.8		190	106,330
Average	0.57	73.57		95	8,860.8
Range	0.0-2.5	59-85.1	7.1-7.5	65-125	610-28,800

TABLE II
PHYSICOCHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT CM 165 (MILE 18.9)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	1,510	250	16.0	14.7	2.7	<0.01		.025	18	18	14	7
5/15/74	1,200	234	4.30	4.30	1.8	0.01		.023	0	0	17	4
4/23/74	3,700	549	8.72	8.44	3.9	<0.01		.008	22	22	18	4
3/19/74	2,700	420	12.4	10.8	6.7	<0.01			36	20	13.7	4
2/14/74	3,300	476	11.7	7.46	3.2	.07			50	28	45	6
1/17/74	2,405	1,820	5.41	4.53	2.8	.13			52	16	20	3
12/10/73	5,770	1,020	9.8	6.16	9.6	.01			103	22	15	6
11/15/73		218	4.92	4.24	7.1	.06			39	9	17	2
10/16/73	150	20.8	5.12	2.88	5.5	.22			66	23	31	24
9/11/73	2,860	568	7.00	3.31	4.4	.11			114	21		2
8/14/73	8,564	60	4.75		.59	.02	3.22	.009	60	5		6
7/11/73	90	9	1.47		.81	.20	.98	.012	50	50		3
Total	32,249	5,584.8	91.59	66.82	49.1	<0.86	4.2	.077	610	234	190.7	73
Average	2,931.72	465.4	7.63	6.68	4.09	<0.07	2.1	.015	50.8	19.5	21.19	6.08
Range	90-8,564	9-1,820	1.47-16.0	2.88-14.7	.59-9.6	<0.01-.22	.98-3.22	.008-.025	0-114	0-50	13.7-45	2-24

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT CM 138 (MILE 11.0)

Date	Chloride	Sulfate	T-PO4	O-PO4	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
4/23/74	4,150	675	6.12	5.66	2.6	.07		.037	6	6	14	4
3/19/74	2,720	408	11.5	10.5	6.3	.03			126	110	11.2	3
2/14/74	2,920	414	13.2	8.29	2.0	.07			26	26	18	1
1/18/74	1,300	34.8	.94	4.46	1.8	.14			46	14	22	3
12/10/73	4,890	113	8.60	4.93	6.8	.13			35	10	9	2
11/15/73	3,210	558	5.83	5.21	7.3	.09			23	5	15	1
10/16/73	395	58	5.5	5.06	4.6	.14			45	12	18	26
9/11/73	670	152	8.24	4.90	6.6	.19			30	0		1
8/14/73	6,840	55	5.67		1.82	.02	3.02	.016	20	0		16
7/11/73	210	9	1.96		1.18	.13	1.37	.012	60	40		4
Total	27,305	2,376.8	66.56	49.01	41	1.01	4.39	.065	417	223	107.2	61
Average	2,730.5	237.7	6.66	4.9	4.1	.10	2.19	.022	41.7	22.3	15.31	6.1
Range	210-6,840	9-675	.94-11.5	4.46-10.5	1.18-7.3	.02-.19	1.37-3.02	.012-.037	6-126	0-110	9-18	1-26

TABLE II

PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT CM 138 (MILE 11.0)

Date	Dissolved Oxygen	Temperature °F	pH	Turbidity	Conductivity	Total Coliform	Fecal Coliform
4/23/74	6.9	73.4	7.9		12,000	2,800	90
3/19/74	4.2	71.6	7.2		7,600	81,000	3,900
2/14/74	4.5	63	7.5		9,000	28,000	300
1/17/74	4.1	56.3	7.2		4,300	25,000	1,440
12/10/73	4.7	61.7	7.7		12,000	18,000	1,180
11/15/73	2.7	74	7.5		9,800	>80,000	
10/16/73	1.2	76	7.1		1,200	33,000	1,534
9/11/73	1.5	80	7.3	80	2,300	14,000	2,000
8/14/73	1.7	86	7.4		18,500	7,900	7,900
7/11/73	2.1	80	7.7	60	770	24,000	7,900
Total	33.6	722		140	77,470	>313,700	26,294
Average	3.36	72.2		70	7,747	>31,370	2,921.5
Range	1.2-6.9	56.3-86	7.1-7.9	60-80	770-18,500	2,800-81,000	90-7,900

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT CM 138 (MILE 11.0)

<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Temperature °F</u>	<u>pH</u>	<u>Turbidity</u>	<u>Conductivity</u>
4/23/74	2.7	72.5	7.6		13,000
3/19/74	0.9	70.7	7.3		8,700
2/14/74	2.9	61	7.4		13,000
1/17/74	6.0	56.3	7.3		15,000
12/10/73	2.2	62.6	7.7		14,000
11/15/73	4.0	73.5	7.7		13,400
10/16/73	1.4	76	7.0		1,150
9/11/73	2.4	81	7.8	65	13,000
8/14/73	1.2	85	7.6		34,600
7/11/73	1.1	81	7.4	60	8,700
Total	24.8	719.6		125	134,550
Average	2.48	71.96		62.5	13,455
Range	0.9-6.0	56.3-85	7.0-7.8	60-65	1,150-34,600

TABLE II
PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT CM 138 (MILE 11.0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
4/23/74	4,450		8.42	8.16	3.5	.03		.009	8	8	14	2
3/19/74	3,070	572	10.6	9.28	5.7	.09			144	110	11	2
2/14/74	4,370	668	13.9	7.96	1.7	<.01			82	30	20	3
1/18/74	5,130	1,500	1.92	3.90	1.7	.06			56	26	18	2
12/10/73	6,000	1,230	8.48	5.82	7.6	.10			57	23	12	2
11/15/73	4,550	518	4.78	3.18	5.3	.66			420	36	16	1
10/16/73	362	158	7.46	5.44	4.8	.14			36	8	18	24
9/11/73	4,600	640	3.64	2.65	3.6	.11			60	8		1
8/14/73	10,956	57	2.45		.00	.08	.62	.020	80	10		9
7/11/73	2,520	149	.95		.00	.10	.32	.013	70	40		3
Total	46,008	5,492	62.6	46.39	33.9	<1.38	.94	.042	1,013	299	109	49
Average	4,600.8	549.2	6.26	5.80	3.39	<.138	.47	.014	101.3	29.9	15.57	4.9
Range	362-10,956	57-1,500	.95-13.9	2.65-9.28	0-7.6	<.01-.66	.32-.62	.009-.020	8-420	8-110	11-20	1-24

TABLE II
PHYSICO-CHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT THE MONUMENT (MILE 9.0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	2,070	312	11.9	10.9	2.0	.07		0	20	20	16	1
5/15/74	1,000	152	1.98	1.98	0.4	.23		.024	8	8	13	4
4/23/74	4,210	572	5.36	5.21	2.4	10.35		.046	8	8	16	5
3/19/74	2,920	524	11.3	9.64	6.3	.07			34	30	11.4	2
2/14/74	1,780	235	9.42	4.77	0.8	.11			48	22	24	2
1/17/74	6,470											
12/10/73	3,550	457	5.77	3.40	4.5	.18			54	14	10	1
11/15/73	3,250	464	5.51	4.80	6.8	.09			20	3	17	<1
10/16/73	475	145	6.2	4.6	5.3	7.2			40	9	20	16
9/11/73	740	126	6.27	3.78	5.3	.19			31	0		1
8/14/73	6,120	58	5.67		1.11	.02	2.43	.013	15	0		5
7/11/73	210	46	1.23		1.11	.08	1.18	.015	50	50		4
Total	32,795	3,109	70.61	49.08	36.02	18.59	3.61	.098	328	164	127.4	<42
Average	2,732.92	282.64	6.42	5.45	3.27	1.69	1.80	.02	29.82	14.91	15.92	<3.82
Range	210-6,470	46-572	1.23-11.9	1.98-10.9	0.4-6.8	.02-10.35	1.18-2.43	0-.046	8-54	0-50	10-24	<1-16

TABLE II
PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT THE MONUMENT (MILE 9.0)

Date	Dissolved Oxygen	Temperature °F	pH	Turbidity	Conductivity	Total Coliform	Fecal Coliform
6/12/74	1.3	83.5	7.5		6,400	1,500	80
5/15/74	5.9	78.8	8.2		3,050	69,000	200
4/23/74	6.4	73.4	7.9		11,800		
3/19/74	4.6	71.6	7.3		8,500	32,000	1,200
2/14/74	6.4	63	7.5		5,600	4,100	310
1/17/74	6.9	60.8				36,000	1,000
12/10/73	6.7	59	7.8		8,000	3,750	150
11/15/73	3.4	74	7.3		9,800	>80,000	
10/16/73	2.5	73.5	7.2		1,480	2,937	1,221
9/11/73	2.6	81	7.3	75	2,400	4,000	100
8/14/73	0.8	85	7.4		19,100	2,300	2,300
7/11/73	2.5	81	7.4	65	1,040	7,900	7,900
Total	50	884.6		140	77,170	>243,487	14,461
Average	4.17	73.72		70	7,015.45	>22,135.18	1,446.1
Range	0.8-6.9	59-85	7.2-8.2	65-75	1,040-19,100	1,500->80,000	80-7,900

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT THE MONUMENT (MILE 9.0)

<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Temperature °F</u>	<u>pH</u>	<u>Turbidity</u>	<u>Conductivity</u>
6/12/74	2.5	80.6	7.5		11,000
5/15/74	1.2	77	7.5		5,380
4/23/74	3.0	72.5	7.6		12,600
3/19/74	1.9	70.7	7.4		8,700
2/14/74	3.5	60.0	7.4		13,000
1/17/74	8.1	55.4	7.2		18,000
12/10/73	2.6	62.6	7.7		17,000
11/15/73	3.7	72	7.5		11,600
10/17/73	1.3	76	7.1		1,350
9/11/73	4.3	81	7.7		13,500
8/14/73	1.3	84	7.6		30,600
7/11/73	1.9	81	7.7	70	7,100
Total	35.3	872.8		70	149,830
Average	2.94	72.73		70	12,495.8
Range	1.2-8.1	55.4-84	7.1-7.7	70	1,350-30,600

TABLE II

PHYSICOCHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT THE MONUMENT (MILE 9.0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	3,300	506	6.18	5.37	0.6	.19		0	32	32	9	4
5/15/74	1,750	332	4.28	3.60	1.6	.14		.040	0	0	14	2
4/23/74	4,500	606	6.68	6.52	3.1	.06		.020	10	10	13	2
3/19/74	3,000	540	9.88	9.11	6.0	.09			54	4	12.8	2
2/14/74	4,520	684	15.3	7.27	1.4	.03			94	32	22	3
1/17/74	6,470	4,120	3.40	2.55	0.8	.03			50	18	17	2
12/10/73	7,410	1,500	5.18	2.93	3.9	.16			63	20	8	2
11/15/73	4,000	370	3.70	3.36	5.2	.12			39	9	16	<1
10/17/73	425	92	6.27	4.87	5.4	.11			39	11	20	14
9/11/73	4,790	755	4.52	2.79	2.4	.12			75	9		1
8/14/73	9,760	60	3.19		.44	.06	1.55	.020	30	0		5
7/11/73	1,990	135	1.47		.84	.08	.98	.015	80	50		4
Total	51,915	9,700	70.05	48.37	31.68	1.19	2.53	.095	566	195	131.8	<42
Average	4,326.25	808.33	5.84	4.84	2.64	0.099	1.265	.019	47.17	16.25	14.64	<3.5
Range	425-9,760	60-4,120	1.47-15.3	2.55-9.11	.44-6.0	.03-.19	.98-1.55	0-.040	0-94	0-50	9-22	<1-14

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT MORGAN'S POINT (MILE 0)

Date	Dissolved Oxygen	Temperature °F	pH	Turbidity	Conductivity	Total Coliform	Fecal Coliform
6/12/74	8.6	84.2	8.2		11,300	600	<10
5/15/74	7.7	79.7	8.3		11,800	10,000	10
4/23/74	8.3	73.4	7.3		800	700	<10
3/19/74	9.2	71.6	7.9		11,500	4,000	60
2/14/74	9.1	62	8.1		12,000	1,300	10
1/18/74	9.4	59.9	7.2		6,300		
12/10/73	7.6	59.9	8.1		13,000	572	14
11/15/73	5.7	72.5	7.8		11,300	924	
10/16/73	5.7	76	8.0		16,000	8,300	190
9/11/73	6.1	81	7.9	105	7,900	1,700	70
8/14/73	7.5	84	8.3		24,800	<200	<200
7/11/73	5.2	85	7.6	50	5,200	3,300	3,300
Total	90.1	889.2		155	120,600	<31,596	<3,874
Average	7.5	74.1		77.5	10,050	<2,872.36	387.4
Range	5.2-9.4	59.9-85	7.2-8.3	50-105	5200-248000	<200-10,000	<10-3,300

TABLE II

PHYSICO-CHEMICAL CHARACTERISTICS OF SURFACE WATER (1 FOOT)
AT MORGANS POINT (MILE 0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	6,150	516	3.66	2.84	0	.22		.037	10	10	11	4
5/15/74	3,950	594	4.18	4.18	0	.14		.068	120	2	13	5
4/23/74	5,570	807.5	2.82	2.30	.2	.09		.027	238	86	10	4
3/19/74	4,150	760	4.14	3.41	2.9	.19			42	6	7.2	4
2/14/74	4,260	800	4.84	2.76	0	.21			52		8	4
1/18/74	1,950	420	2.86	2.22	.8	.07			34	14	21	5
12/10/73	5,500	408	5.57	3.15	3.2	.21			38	15	9	2
11/15/73	3,890	640	2.57	1.95	2.0	.23			30	6	6	
10/16/73	6,230	530	2.12	2.12	1.0	.15			172	27	20	14
9/11/73	2,690	233	3.56	2.15	2.6	.18			133	14		1
9/14/73	6,912	71	2.40		.29	.09	1.27	.043	40	10		6
7/11/73	1,646	106	.95		.53	.16	.78	.015	50	50		4
Total	52,898	5,885.5	39.67	27.08	13.52	1.94	2.05	.19	959	240	105.2	53
Average	4,408.17	490.46	3.30	2.708	1.13	.16	1.025	.038	79.92	21.82	11.69	4.82
Range	1,646-6,230	71-807.5	.95-5.57	1.95-4.18	0-3.2	.09-.23	.78-1.27	.015-.068	10-238	2-86	4-23	1-14

TABLE II

PHYSICOCHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT MORGANS POINT (MILE 0)

<u>Date</u>	<u>Dissolved Oxygen</u>	<u>Temperature °F</u>	<u>pH</u>	<u>Turbidity</u>	<u>Conductivity</u>
6/12/74	4.5	81.5	7.8		17,500
5/15/74	8.1	79.7	8.3		14,200
4/23/74	7.3	72.5	8.2		17,300
3/19/74	8.7	71.6	8.0		12,500
2/14/74	7.0	60	8.3		22,000
1/18/74	10.0	55.4	8.2		21,000
12/10/73	8.1	58.1	8.2		23,000
11/15/73	3.9	71	7.7		12,800
10/16/73	5.8	76	7.4		2,500
9/11/73	5.5	81	7.9		13,000
8/14/73	3.3	84	8.1		42,900
7/11/73	2.5	82	7.7	80	32,000
Total	74.7	872.8		80	230,700
Average	6.22	72.73		80	19,225
Range	2.5-10	55.4-84	7.4-8.3	80	2,500-42,900

TABLE II
PHYSICO-CHEMICAL CHARACTERISTICS OF BOTTOM WATER (40 FEET)
AT MORGANS POINT (MILE 0)

Date	Chloride	Sulfate	T-PO ₄	O-PO ₄	NH ₃ -N	NO ₃ -N	Total N	Chlor a	TSS	VSS	TOC	BOD
6/12/74	6,150	834	2.33	1.48	0	.17		.027	58	20	11	1
5/15/74	4,750	595	3.60	2.78	.1	.12		.063	172	10	16	5
4/23/74	6,260	765	2.20	1.84	.2	.06		.026	70	52	11	3
3/19/74	4,570	724	2.69	2.69	2.2	.12			204	30	8.8	4
2/14/74	8,200	608	1.96	2.42	0	.17			470	60	9	3
1/18/74	7,350	1,600	1.08	1.89	.1	.03			99	22	23	2
12/10/73	10,450	411	3.79	.84	.5	.09			93	24	6	1
11/15/73	4,460	750	4.67	1.70	2.1	.25			46	6	4	
10/16/73	810	154	3.04	2.03	1.4	.21			74	8	17	10
9/11/73	4,850	536	5.24	3.01	3.4	.11			95	14		1
8/14/73	17,428	70	.95		.05	.03	.34	.015	100	10		5
7/11/73	10,000	57	.95		.00	.16	.32	.017	120	60		2
Total	85,278	7,104	32.5	20.68	10.05	1.52	.66	.148	1,601	316	105.8	37
Average	7,106.5	592	2.71	2.07	.84	.13	.33	.029	133.4	26.3	11.75	3.36
Range	810-17,428	57-1,600	.95-5.24	.84-3.01	0-3.4	.03-.25	.32-.34	.015-.063	46-470	6-60	4-23	1-10

TABLE III

HOUSTON SHIP CHANNEL - METALS IN WATER (mg/l)
TURNING BASIN (MILE 25.0)

Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc	Iron
6/12/74	187	100	10	10	650	120	190	.90	270		10	170	1000
5/15/74	58	100	10	20	240	110	170	1.1	230		10	190	810
4/23/74	124	100	10	20	110	70	160	.20	100		30	110	740
3/19/74	189	210	10	20	160	80	180	1.2	160		10	220	1230
2/14/74	51	200	10	10	100	40	180	.80	90		10	200	1330
1/18/74	14	200	10	20	210	50	120	.20	250		10	530	2000
12/11/73	19	400	10	20	170	110	160	2.20	150		10	190	650
11/16/73	11	380	10	10	100	10	170	2.6	140		10	150	1730
10/16/73	4	390	10	10	120	70	150	.2	50		10	278	2110
9/11/73	4.3	600	4	6	147	10	173	.20	70		1	116	
8/14/73	28	500	8	100	50	20	150	3.64	120	5	50	125	
7/11/73	8	200	8	20	80	40	94	.54	40	2	10	100	
Total	697.3	3380	110	266	2137	730	1897	13.78	1670	7	171	2379	11810
# Computed	12	12	12	12	12	12	12	12	12	2	12	12	9
Average	58.11	281.67	9.17	22.17	178.08	60.83	158.08	1.15	139.17	3.5	14.25	198.25	1312.22
Range	4-189	100-600	4-10	6-100	50-650	10-120	94-190	.2-3.64	40-270	2-5	1-50	100-530	660-2110

TABLE III

HOUSTON SHIP CHANNEL - METALS IN WATER (mg/l)
CM 165 (MILE 18.9)

Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc	Iron
6/12/74	43	100	10	10	250	90	190	.90	140		10	60	560
5/15/74	51	100	10	10	320	70	110	1.2	90		10	90	460
4/23/74	59	100	10	20	270	90	160	.20	130		10	490	430
3/19/74	31	200	20	10	140	130	170	1.0	60		10	130	870
2/14/74	14	200	10	10	110	80	190	.80	130		20	140	1770
1/18/74	14	200	10	10	120	30	130	.20	110		10	160	1070
12/11/73	23	400	10	30	110	120	150	2.20	120		20	160	700
11/16/73	6	300	20	20	120	10	130	2.5	190		10	120	540
10/16/73	10	170	10	10	60	70	90	.4	50		10	150	800
9/11/73	.5	100	1	12	188.2	30	118	.20	110		1	102	
8/14/73	14	500	17	100	110	20	180	3.36	50	5	60	180	
7/11/73	3	200	8	20	160	40	80	.50	90	2	10	120	
Total	268.5	2570	136	262	1958.2	780	1698	13.46	1270	7	181	1902	7200
# Computed	12	12	12	12	12	12	12	12	12	2	12	12	9
Average	22.375	214.17	11.33	21.83	163.18	65	141.5	1.12	105.83	3.5	15.08	158.5	800
Range	.5-59	100-500	1-20	10-100	60-320	10-130	80-190	.2-3.36	50-190	2-5	1-60	60-490	430-1770

TABLE III

HOUSTON SHIP CHANNEL - METAL IN WATER (mg/l)
MONUMENT (MILE 9.0)

Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc	Iron
6/12/74	23	100	10	10	310	140	150	.90	110		10	70	420
5/15/74	16	100	10	10	160	90	130	.20	110		10	80	400
4/23/74	16	100	10	10	60	120	170	.20	110		20	140	420
3/19/74	26	200	10	10	80	130	220	1.0	140		10	90	780
2/14/74	14	200	10	10	130	120	150	.80	110		20	80	940
1/18/74	14	200	10	10	180	50	120	.20	130		10	70	1350
12/11/73	14	500	20	20	80	110	110	2.80	100		20	100	440
11/16/73	3	230	20	20	180	10	110	2.6	200		20	120	510
10/16/73	6	240	10	20	70	20	120	0.3	40		5	104	
9/11/73	1.4	100	3	12	186.4	70	90	.20	160		9	85	
8/14/73	14	500	8	100	50	20	150	3.36	80	5	50	70	
7/11/73	3	200	8	20	140	40	145	.77	100	2	10	170	
Total	150.4	2670	119	252	1626.4	920	1665	13.33	1390	7	174	1179	5260
# Computed	12	12	12	12	12	12	12	12	12	2	12	12	8
Average	75.2	222.5	9.92	21	135.53	76.67	138.75	1.11	115.83	3.5	14.5	98.25	657.5
Range	1.4-26	100-500	3-20	10-100	50-186.4	10-140	90-220	.2-3.36	40-200	2-5	5-50	70-170	400-1350

TABLE III

HOUSTON SHIP CHANNEL - METALS IN WATER (mg/l)
CM 138 (MILE 11.0)

Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc	Iron
4/23/74	14	100	10	10	160	70	160	.40	110		20	100	360
3/19/74	40	200	10	10	130	100	170	1.0	170		10	260	750
2/14/74	14	200	10	10	130	120	150	.80	110		20	80	940
1/18/74	14	200	10	10	80	30	150	.20	110		10	90	960
12/11/73		400	20	20	90	130	130	2.60	140		20	110	370
11/16/73	9	250	30	20	190	10	120	2.3	210		10	120	610
10/16/73	3	280	10	40	70	10	160	.20	80		5	204	
9/11/73	3	100	4	7	162.7	80	120	.20	150		2	186	
8/14/73	16	500	8	100	120	20	120	.379	110	5	60	60	
7/11/73	6	200	8	20	160	40	170	.62	310	2	10	230	
Total	119	2430	120	247	1292.7	610	1450	8.699	1500	7	167	1440	3990
# Computed	9	10	10	10	10	10	10	10	10	2	10	10	6
Average	13.22	243	12	24.7	129.27	61	145	.87	150	3.5	16.7	144	665
Range	3-40	100-500	4-30	7-100	70-190	10-130	120-170	.20-2.60	80-310	2-5	2-60	60-260	360-960

TABLE III
HOUSTON SHIP CHANNEL - METALS IN WATER (mg/l)
MORGANS POINT (MILE 0)

Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc	Iron
6/12/74	14	100	20	10	260	110	80	.90	180		20	140	720
5/15/74	14	100	20	20	360	90	70	.20	110		10	120	450
4/23/74	14	100	10	20	150	110	70	.20	140		30	130	390
3/19/74	17	200	20	10	120	150	140	1.20	150		20	100	1560
2/14/74	14	100	20	10	100	190	230	.60	110		40	60	2150
1/18/74	14	200	10	20	130	100	70	.20	200		10	80	710
12/11/73	16	400	20	10	120	140	70	2.20	150		20	110	620
11/16/73	3	270	30	20	110	110	70	2.8	260		20	130	620
10/16/73	3	290	20	10	100	70	130	.02	160		14	132	
9/11/73	3	100	9	14	80.5	50	78	.20	220		13	65	
8/14/73	12	500	8	100	50	20	100	4	90	5	60	60	
7/11/73	1.0	200	8	20	160	60	80	.77	160	2	10	140	
Total	125	2560	195	264	1740.5	1200	1188	13.29	1930	7	267	1267	7220
# Computed	12	12	12	12	12	12	12	12	12	2	12	12	8
Average	10.42	213.33	16.25	22	145.04	100	99	1.11	160.83	3.5	22.25	105.58	902.5
Range	1-17	100-500	8-30	10-100	50-360	20-190	70-230	.02-4	90-260	2-5	10-60	60-140	390-2150

TABLE IV
RELATION OF THE NUMBER OF SPECIES AND NUMBER OF INDIVIDUALS OF PLANKTON
TAKEN FROM THE HOUSTON SHIP CHANNEL

	Turning Basin	Sims Bayou	Greens Bayou	Monument	Morgans Point
May 15, 1974					
Number Species	8	8	14	14	12
Number Individuals	49	105	368	368	700
April 23, 1974					
Number Species	4	7	11	5	11
Number Individuals	472	244	417	264	265
March 19, 1974					
Number Species	10	14	9	12	12
Number Individuals	214	276	83	166	649
February 14, 1974					
Number Species	11	10	9	15	14
Number Individuals	137	105	98	428	490
January 17, 1974					
Number Species	16	12	14	11	14
Number Individuals	217	119	175	3036	4595
December 10, 1973					
Number Species	4	15	11	13	14
Number Individuals	4	46	11	14	40
November 15, 1973					
Number Species	3	4	9	5	8
Number Individuals	5	5	11	8	35
October 16, 1973					
Number Species	4	0	2	2	5
Number Individuals	4	0	2	4	19

TABLE IV

RELATION OF THE NUMBER OF SPECIES AND NUMBER OF INDIVIDUALS OF PLANKTON
TAKEN FROM THE HOUSTON SHIP CHANNEL

	<u>Turning Basin</u>	<u>Sims Bayou</u>	<u>Greens Bayou</u>	<u>Monument</u>	<u>Morgans Point</u>
September 9, 1973					
Number Species	2	5	2	3	6
Number Individuals	3	9	30	37	85
July 11, 1973					
Number Species	5	5	4	8	5
Number Individuals	15	17	25	737	721
Mean Species	7	8	9	9	10
Mean Individuals	112	93	122	506	760

June and August samples were not collected because of equipment malfunction.

TABLE V
NUMBER OF SPECIES AND NUMBER OF INDIVIDUALS OF NEKTON
TAKEN FROM INTAKE SCREENS OVER 8-HOUR PERIOD ON THE HOUSTON SHIP CHANNEL

Station	Date	7-11 1973	8-14 1973	9-11 1973	10-16 1973	11-15 1973	12-10 1973	1-17 1974	2-14 1974	3-19 1974	4-23 1974	5-15 1974	6-12 1974	Mean
Diamond Shamrock Company (Deer Park Plant) Channel Mile 11.5														
Number Species		14	0	9	6	11	9	10	11	1	7	1	8	7
Number Individuals		258	0	1525	458	2993	649	463	187	3	3136	100	71	320
Houston Lighting & Power (Deepwater Plant)														
Number Species		10	0	3	4	14	2	2	2	*	*	*	*	5
Number Individuals		27	0	6	4	235	10	14	2	*	*	*	*	37

*Water intake area under construction - unable to collect sample